Instructional Materials Evaluation Criteria – Fourth Grade Mathematics

Title _____ **ISBN#** _____

Established Track Record? YES ☐ NO ☐
If yes, please list research source(s):

Meets National Mathematics Standards? YES ☐ NO ☐

Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.

Objectives	Indicators	Covered? Yes	Covered? No	Explanation of Coverage	Percentage of Coverage
Objective 1.1: Demonstrate multiple ways to represent whole numbers and decimals, from hundredths to one million, and fractions.	a. Read and write numbers in standard and expanded form.				
	b. Demonstrate multiple ways to represent whole numbers and decimals by using models and symbolic representations (e.g., 36 is the same as the square of six, three dozen, or 9x4).				
	c. Identify the place and the value of a given digit in a six-digit numeral, including decimals to hundredths and round to the nearest tenth.				
	d. Divide regions, lengths, and sets of objects into equal parts using a variety of models and illustrations.				
	e. Name and write a fraction to represent a portion of a unit whole, length, or set for halves, thirds, fourths, fifths, sixths, eighths, and tenths.				
	f. Identify and represent square numbers using models and				

	symbols.				
Objective 1.2: **Order, compare, and identify relationships among whole numbers, commonly used fractions, and decimals to hundredths.**	a. Compare the relative size of numbers (e.g., 475 is comparable to 500, 475 is small compared to 10,000 but large compared to 98).				
	b. Order and compare whole numbers up to six digits, simple fractions, and decimals using a variety of methods (e.g., number line, models) and the symbols <, >, and =.				
	c. Identify a number that is between two given numbers (e.g., 3.2 is between 3 and 4, find a number between 0.1 and 0.2).				
	d. Identify equivalences between fractions and decimals by connecting models to symbols.				
	e. Generate equivalent fractions and simplify fractions using models, pictures, and symbols.				
Objective 1.3: **Model and illustrate meanings of multiplication and division of whole numbers and the addition and subtraction of fractions.**	a. Model multiplication (e.g., equal-sized groups, rectangular arrays, area models, equal intervals on the number line), place value, and properties of operations to represent multiplication of a one- or two-digit factor by a two-digit factor and connect the representation to an algorithm.				
	b. Use rectangular arrays to interpret factoring (e.g., find all rectangular arrays of 36 tiles and relate the dimensions of the arrays to factors of 36).				

	c. Demonstrate that multiplication and division are inverse operations (e.g. 3x4=12; thus, 12÷4=3 and 12÷3=4) and use that relationship to explain that division by zero is not possible.				
	d. Represent division of a three-digit dividend by a one-digit divisor, including whole number remainders, using a variety of methods (e.g., rectangular arrays, manipulatives, pictures) and connect the representation to an algorithm.				
	e. Use models to add and subtract simple fractions where one single-digit denominator is 1, 2, or 3 times the other (e.g., 2/4 + ¼ ; ¾ - 1/8).				
Objective 1.4: **Solve problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.**	a. Use estimation, mental math, paper pencil, and calculators to perform mathematical calculations and identify when to use each one appropriately.				
	b. Select appropriate methods to solve a single operation problem and estimate computational results or calculate them directly, depending on the context and numbers involved in a problem.				
	c. Write a story problem that relates to a given multiplication or division equation and select and write a number sentence to solve a problem related to the environment.				

	d. Solve problems involving simple fractions and interpret the meaning of the solution (e.g., A pie has been divided into six pieces and one piece is already gone. Mary takes two pieces. How many pieces remain? What fraction of the whole pie is left?)				
Objective 1.5: Compute problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.	a. Demonstrate quick recall of basic multiplication and division facts.				
	b. Multiply up to a three- digit factor by a two-digit factor with fluency and using efficient procedures				
	c. Divide up to a three-digit dividend by a one-digit divisor with fluency and using efficient procedures.				
	d. Add and subtract decimals and simple fractions where one single-digit denominator is 1, 2, or 3 times the other (e.g., $\frac{2}{4}+\frac{1}{4}=\frac{3}{4}; \frac{1}{3}-\frac{1}{6}=\frac{1}{6}$).				

Standard 2: Students will use patterns and relations to represent mathematical problems and number relationships.

Objectives	Indicators	Covered? Yes	Covered? No	Explanation of Coverage	Percentage of Coverage
Objective 2.1: Identify, analyze, and determine rules for describing numeric patterns involving operations and nonnumeric growing patterns.	a. Analyze growing patterns using objects, pictures, numbers, and tables to determine a rule for the pattern.				
	b. Recognize, represent, and extend simple patterns involving multiples and other number				

	patterns (e.g., square numbers) using objects, pictures, numbers, and tables.				
	c. Identify simple relationships in real-life contexts and use mathematical operations to describe the pattern (e.g., the number of legs on a given number of chairs may be determined by counting by 4's or by multiplying the number of chairs by 4).				
Objective 2.2: **Use algebraic expressions, symbols, and properties of the operations to represent, simplify, and solve mathematical equations and inequalities.**	a. Use the order of operations to evaluate, simplify, and compare mathematical expressions involving the four operations, parentheses, and the symbols <, >, =, (e.g., 2x(4-1)+3; Of the two quantities: 7-(3-2) or (7-3)-2, which is greater?).				
	b. Express single operation problem situations as equations and solve the equation.				
	c. Recognize that a given variable maintains the same value throughout an equation or expression (e.g., Δ+ Δ=8; thus, Δ=4).				
	d. Describe and use the commutative, associative, distributive, and identity properties of addition and multiplication, and the zero property of multiplication.				

Standard 3: Students will understand attributes and properties of plane geometric objects and spatial relationships.					
Objectives	**Indicators**	**Covered? Yes**	**Covered ? No**	**Explanation of Coverage**	**Percentage of Coverage**
Objective 3.1: Identify and describe attributes of two-dimensional geometric shapes.	a. Identify and describe lines that are parallel, perpendicular, and intersecting.				
	b. Identify and describe right, acute, obtuse, and straight angles.				
	c. Identify and describe the radius and diameter of a circle.				
	d. Identify and describe figures that have line symmetry and rotational symmetry.				
	e. Compare two polygons to determine whether they are congruent.				
Objective 3.2: Specify locations using grids and maps.	a. Locate coordinates in the first quadrant of a coordinate grid.				
	b. Give the coordinates in the first quadrant of a coordinate grid.				
	c. Locate regions on a map of Utah.				
	d. Give the regions on a map of Utah.				
Objective 3.3: Visualize and identify geometric shapes after applying transformations.	a. Identify a translation (slide), rotation (turn), or a reflection (flip) of a geometric shape.				
	b. Recognize that 90°, 180°, 270°, and 360° are associated, respectively, with 1/4, 1/2, 3/4, and full turns.				

Standard 4: Students will describe relationships among units of measure, use appropriate measurement tools, and use

formulas to find area measurements.					
Objectives	**Indicators**	**Covered? Yes**	**Covered ? No**	**Explanation of Coverage**	**Percentage of Coverage**
Objective 4.1: Describe relationships among units of measure for length, capacity, and weight and determine measurements of angles using appropriate tools.	a. Describe the relative size among metric units of length (i.e., millimeter, centimeter, meter), between metric units of capacity (i.e., milliliter, liter), and between metric units of weight (i.e., gram, kilogram).				
	b. Describe the relative size among customary units of capacity (i.e., cup, pint, quart, gallon).				
	c. Estimate and measure capacity using milliliters, liters, cups, pints, quarts, and gallons and measure weight using grams and kilograms.				
	d. Recognize that angles are measured in degrees and develop benchmark angles (e.g., 45°, 60°, 120°) using 90° angles to estimate angle measurement.				
	e. Measure angles using a protractor or angle ruler.				
Objective 4.2: Recognize and describe area as a measurable attribute of two-dimensional shapes and calculate area measurements.	a. a. Connect area measure of rectangles with the area model for multiplication.				
	b. Develop the area formula for a rectangle as the number of unit squares that fit in the rectangle and identify the unit of measure as square units.				
	c. Develop and use the area formula for a right triangle by				

	comparing with the formula for a rectangle (e.g., two of the same right triangles makes a rectangle).				
	d. Develop the formulas and justify the relationships among area formulas of triangles and parallelograms by decomposing and comparing with areas of right triangles and rectangles.				
	e. Determine possible perimeters, in whole units, for a rectangle with a fixed area and determine possible areas when given a rectangle with a fixed perimeter.				

Standard 5: Students will interpret and organize collected data to make predictions, answer questions, and describe basic concepts of probability.					
Objectives	**Indicators**	**Covered? Yes**	**Covered ? No**	**Explanation of Coverage**	**Percentage of Coverage**
Objective 5.1: Collect, organize, and display data to answer questions.	a. Identify a question that can be answered by collecting data.				
	b. Collect, read, and interpret data from tables, graphs, charts, surveys, and observations.				
	c. Represent data using frequency tables, bar graphs, line plots, and stem and leaf plots.				
	d. Identify and distinguish between clusters and outliers of a data set.				
Objective 5.2: Describe and predict simple random outcomes.	a. Describe the results of investigations involving random outcomes as simple ratios (e.g., 4 out of 9, 4/9).				

	b. Predict outcomes of simple experiments, including with and without replacement, and test the predictions.				

Curriculum Coverage	**3**	**2**	**1**	**0**	**N/A**
Meets Core Standards and Objectives	80% of the state core objectives are covered. Objectives in instructional materials are clearly stated with measurable outcomes.	70% of the state core objectives are covered. Objectives in instructional materials are clearly stated with measurable outcomes.	50% of the state core objectives are covered.	Less than half of the state core objectives are covered.	
Content	Accurate information reflecting current mathematical knowledge. No content bias.	Some inaccuracies found, however information reflects current mathematical knowledge. No content bias.	Many inaccuracies were found on major mathematical concepts or content bias created problems with mathematical concepts.	Major inaccuracies found in mathematical content or concepts.	
Covers Process Skills	Materials support and encourage students to use mathematical process skills (i.e., problem solving, communication, reasoning, and proof, connections, representation).	Materials provide a range of activities with set outcomes. Process skills are mentioned but not incorporated into instructional process.	Materials provide a set of explicit step-by-step instructions. Limited amount of process skills mentioned.	No hands-on activities. No process skills mentioned.	
Age Appropriate	A wide range of activities to accommodate various developmental levels at a reasonable pace and depth of coverage. Includes age appropriate cross-curricular references (e.g., literature, software, etc.) Content organized so prerequisite skills and knowledge are developed before more complex skills.	Some activities are adaptable to the appropriate age level. Some cross-curricular activities are given. Some attention given to prerequisite skills and knowledge.	Limited developmentally appropriate activities. Prerequisite skills and prior knowledge are not sufficiently developed before more complex concepts are introduced.	Age appropriate issues are not addressed. Several activities are not based on appropriate levels.	
Pedagogically Sound	Facilitates a wide range of teacher and student activities that reflect various learning styles and individual needs of students. Includes a wide variety of pedagogical strategies for flexible grouping and instruction.	Encourages and assists teachers in addressing learning styles and individual needs of students. Includes various pedagogical strategies for flexible grouping and instruction.	Addresses differences in learning and teaching to a limited degree. Includes some pedagogical strategies for flexible grouping and instruction.	Hinders effective pedagogy.	

Physical Qualities	**3**	**2**	**1**	**0**	**N/A**
Durability	Materials are securely bound and reinforced.	Materials are hardbound adequately.	Materials have secure binding.	Materials have inferior binding.	
Print Size and legibility for intended grade level	Appropriate use of font size and format for intended grade level.	Font size adequate for intended grade level.	Font size and format too small or too large for age group.	Font size inconsistent.	
	Key words or phrases bold faced and/or italicized.	Some key words or phrases boldfaced and/or italicized.	Highlighting was used too much, emphasized too much information.	No key words or phrases boldfaced or italicized.	
Pictures, tables, and graphics	Appropriate and varied pictures, tables, and graphs. Graphs and tables are correctly labeled (e.g., titles, keys, labels).	Limited pictures, tables, and graphs. Some tables and graphs are not labeled correctly.	Very limited pictures, tables, and graphs.	Inappropriate pictures, tables, and graphs.	
Includes table of content, glossaries, and index	Tables of contents, indices, glossaries, content summaries, and assessment guides are designed to help teachers, parents/guardians, and students. Clearly represents concepts within the text.	Tables of contents, indices, glossaries, content summaries, and assessment guides are designed to help teachers, parents/guardians, and students, are adequate but not clearly defined concepts within the text.	Simple tables of contents, indices, glossaries, content summaries, and assessment guides are included.	Is missing one or more of the following: simple table of contents, glossaries, content summaries, assessment guides, or indices.	
Ancillary Materials	**3**	**2**	**1**	**0**	**N/A**
Teacher Materials	Lesson plans are easy to understand and implement. Are clearly written and presented with accurate concepts.	Most lesson plans are easy to understand and implement. Are clearly written and presented with accurate concepts.	Lesson plans are difficult to understand.	No lesson plans.	
	Mathematical terms and academic vocabulary are appropriately used.	Generally mathematical terms and academic vocabulary are appropriately used.	Some mathematical terms and academic vocabulary are appropriately used.	There is a lack of mathematical terms and academic vocabulary.	
	Incorporates integration suggestions to other curriculum areas.	Most integration supports other curricular areas.	Some integration support for other curricular areas.	No integration support available.	
	Investigations and problem solving activities focus on demonstrating mathematical principles in the content area.	Most investigations and problem solving activities focus on demonstrating mathematical principles in the content area.	Limited investigations and problem solving activities focus on demonstrating mathematical principles in the content area.	Investigations and problem solving activities are not related to content area or no investigation activities.	

Ancillary Materials cont.	**3**	**2**	**1**	**0**	**N/A**
Student Materials	Activities engage students in purposeful mathematics.	Most activities engage students in purposeful mathematics.	Some activities engage students in purposeful mathematics.	Activities do not develop the concept studied.	
	Activities incorporate use of process skills (i.e., problem solving, communication, reasoning and proof, connections, representation) for deep understanding of mathematical principles.	Activities encourage the use of process skills for deep understanding of mathematical principles.	Activities mention the use of process skills for deep understanding of mathematical principals.	Activities do not encourage process skills for deep understanding of mathematics.	
	Includes ideas to extend concepts in real world applications.	Some ideas are included to extend concepts in real world applications.	Limited real world applications.	No real world applications suggested.	
Parent Materials	Homework assignments and activities support classroom learning and are written so that parents/guardians can help their children.	Suggested strategies and activities to assist parents/guardians.	Limited activities available for parent/guardian use.	No parent/guardians activities included.	
	ESL strategies and activities that support classroom learning are provided in materials sent home to parents.	Some ESL strategies and activities are provided in materials sent home to parents.	A few ESL strategies and activities that may be sent home to parents are provided.	No ESL strategies and activities are provided.	
Manipulatives	Manipulatives are provided and are appropriate.	Manipulatives are provided.	Manipulatives are not provided.	Manipulatives are not part of the program.	
	Manipulatives can be replaced economically and locally.	Manipulatives can be replaced locally or by mail order.	Needed manipulatives can be obtained locally or special ordered.		
Technology (teachers)	**3**	**2**	**1**	**0**	**N/A**
Ease of Use	Menus are easy to read and follow.	Menus are generally easy to read and follow.	Menus are easy to read. Might have to read manual to understand operation of technology. (e.g., laser remote, software.)	Menus are not very descriptive. Hard to follow.	
	User-friendly installation requires a minimal level of computer expertise.	Installation requires little computer expertise.	Installation requires some knowledge or expertise.	Installation requires expertise.	
	Manual and directions are understandable.	Manuals and directions are simple.	Manuals are included.	No manuals or written instructional materials are provided.	

Technology (teachers) cont.	**3**	**2**	**1**	**0**	**N/A**
Audio/Visual attributes	High quality audio and visuals are correct and contribute to overall effectiveness of program.	Audio and visuals are of good quality. Complements program effectiveness.	Audio and visuals are acceptable. Aligned with program content.	Audio and visual defects are apparent. Distracts from program content.	
	Information is current and up-to-date.	Information is current.	Information is mostly current.	Information is out-of-date.	
Enhances learning experience	Enhances learning experience. Adds depth and diversity.	Offers some additional depth and diversity to learning experience.	Mild impact to overall learning experience.	Does not impact learning experience.	
Technology (students)	**3**	**2**	**1**	**0**	**N/A**
Calculator	Appropriate activities and materials are provided to explore and prove conjectures.	Activities help students learn use to use calculator to explore concepts	Activities to learn to use calculators	No use of calculators or calculators used to check work only.	
Computer	Software allows students to explore and prove mathematical conjectures	Software allows students to explore math conjectures	Software demonstrates processes for mathematical applications	Drill and practice only	
Universal Access	**3**	**2**	**1**	**0**	**N/A**
Content accurately reflects diverse population	Provides ways to adapt curriculum for all students (e.g., special needs, learning difficulties, English language learners, advanced learners.)	Provides some ways to adapt curriculum to meet assessed special needs.	Provides limited strategies to assist special needs students.	Inappropriate strategies to assist special needs students.	
	Accurate portrayal of cultural, racial, and religious diversity in society.	Mostly accurate portrayal of cultural, racial, and religious diversity in society.	Does not address diversity in society.	Inaccurate portrayal of diverse populations and society.	
Assessment	**3**	**2**	**1**	**0**	**N/A**
Provides a variety of assessment options	Multiple measurements of individual student progress at regular intervals ensuring success of all students.	Assessment requires students to apply some concepts.	Assessment requires students to apply few concepts.	Provides only paper and pencil assessment.	

Assessment cont.	**3**	**2**	**1**	**0**	**N/A**
Assessment tools	Scoring tools and rubrics in assessment package.	Some scoring tools and rubrics provided.	Very few assessment tools are provided.	Answer keys to paper and pencil assessments.	
Assessment alignment to objectives	Assessment is provided to assess 80% of stated objectives with a variety of assessment strategies and items.	Assessment is provided to assess 70% of stated objectives.	Assessment is provided to assess 50% of stated objectives.	Assessment is provided to assess less than 50% of stated objectives.	
Assessment for understanding	Assessment requires the application of ideas and concepts.	Assessment requires the application of some ideas and concepts.	Assessment requires the application of few ideas and concepts.	No application of ideas and concepts.	